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attempts was caught, but was badly spoiled and thrown away, which, by mere chance, fell on the ground with its wings extended. A few minutes later it was noticed that the insects that flew by were sensibly attracted by this dead insect, which they endeavored to make known by their occasionally alighting directly upon the dead body of their fellow.

Thus noticing the decoying effects of the insect, a number after being chloroformed were set apart as decoys pinned upon the ends of twigs which were stuck in the ground. The effect was quite remarkable; hardly a single butterfly would pass the sight without alighting among them, and became an easy prey to the net. In this way a large number of beautiful specimens were taken which would otherwise have been quite difficult to capture. —*Joseph L. Hancock.*

ENTOMOLOGICAL NOTES.—At the June meeting of the Entomological Society of Washington, Mr. Lugger mentioned the fact that the seeds of the hard maple, so numerous in the Smithsonian grounds, were this year uniformly sterile. He attributed this phenomenon to the inclement weather during the flowering season, which prevented bees from visiting the flowers. He also farther described the mode of fertilization of the common lady's-slipper *(Cypripedium acaule)* by a species of Andrena. —— Mr. Lugger also remarked that a few specimens of the European *Aphodius erraticus* were first found by him in 1878 near Baltimore. Since that time the species has spread and is now so common that it has actually replaced the formerly common *Aphodius fimetarius.*——Mr. J. B. Smith describes and figures, in Entomologia Americana (No. 4), the scent-organs of *Leucarctia acræa* and *Pyrrarctia isabella*, which are thrust out between the 7th and 8th segments of the abdomen of those moths. Similar organs have been observed by Morrison in *Agrotis plecta* and *Euplexia lucipara*, and Dr. Riley has observed them in *Aletia xylina.*

ZOÖLOGY.

CLASSIFICATION OF SPONGES.—Professor W. J. Sollas (Scientif. Proc. Roy. Dublin Socy., v. 1886) thus arranges the sponges:

Class I. Plethospongiæ.
  Sub-class I. Hexactinellida.
  Sub-class II. Desmospongiæ.
  Sub-class III. Myxospongiæ.
Class II. Calcispongiæ.

The great majority of the sponges, as will be seen, belong to the Desmospongiæ. The Myxospongiæ are not regarded as a degenerate group. Sollas resents (Zool. Anzeiger, 1886) the imputation of Heider that his peculiar gastrulas of sponges were merely shriveled blastulæ.

NEW FRESH-WATER CŒLENTERATE.—Dr. Ussow describes (Ann. and Mag. Nat. Hist., XVIII, p. 110, pl. IV, 1886) a new fresh-water Cœlenterate from the rivers of Russia. It is a Hydromedusa, but differs so from all others that it is made the type of a new genus, Polypodium. The young stages are remarkable in that they are passed as parasites in the eggs of the sterlet, about one-fifth of the eggs being thus infected. This stage is described as a cylindrical spiral twisted tube with numerous lateral buds. This feeds upon the yolk granules which are taken up by the *ectodermal* cells and are thence passed to the endodermal ones. From this is developed the free stage, which is more like a normal Hydromedusa and is provided with six, twelve or twenty-four tentacles, but lacks an umbrella. The perfect or sexual stage is not known. A full paper is promised soon.

NERVOUS SYSTEM OF THE SEA-URCHIN.—M. H. Pronho states that if one suitably treats a portion of the integument which covers the test of *Echinus acutus* with chloride of gold or citric acid, numerous bluish lines connected by frequent anastomoses will become apparent; the appearance forcibly recalls that figured by Professor Loven of the peripheral nervous system of *Brissopsis lyrifera*. Examined under a power of 500, the plexus will be found to consist of a large number of fibrils, and some of the principal bundles will be seen passing towards the spines and adjacent pedicellariæ. The fibrils of which this plexus is formed are identical with those of the tentacular and ambulacral nerves, and each is continuous with the fiber from the ambulacral nerve which emerges from one of the tentacular pores; the plexus lies between the external epithelium and a layer of connective tissue which sends off a number of connective bands through the meshes of the nervous plexus to support the epithelium. At the base of each spine there is a relatively well-developed nervous ring. The cellular elements of the plexus are very difficult to detect in the plexus, but they are very numerous and easy to see in the nerve-ring; the author does not, however, agree with M. Romanes in his description of these elements. M. Pronho has also been able to make out a nervous genital ring, which connects the five genital glands with one another and, by means of the five ambulacral trunks, with the peribuccal nervous pentagon. —*Comptes Rendus, cii (1886), pp. 444–6.*

THE CRUSTACEAN CARAPAX.—There seems to be a certain fatality connected with some scientific facts. Away back in 1834 the late Henri Milne-Edwards had a conception of the true morphology of the crustacean carapax, and eighteen years later James D. Dana still further elaborated the matter. But, notwithstanding the weight of their authority, their views failed to gain general acceptance and almost every text-book[1] to-day states that the

[1] Dana's view was adopted by Packard twenty years ago, and is taught in his text-books and lectures.

carapax of crabs and lobsters represents the coalesced terga of all the cephalic and thoracic segments, and a line crossing it is pointed out as the suture dividing the head from the thorax—the cervical suture. This view is wholly erroneous and has arisen from an attempt to trace homologies where none exist. Dr. Howard Ayers (Bulletin Essex Institute, Vol XVII, pp. 49–59, pls. II–III, 1886) has recently restated the problem and the evidence to show that the carapax is in reality to be regarded as the coalesced terga of the antennal and mandibulary segments, and that the "cervical suture" merely indicates the line between them. His presentation of the case should be conclusive. He further shows that the parts regarded by Milne-Edwards as episterna are in reality portions of the sternum cut off by the appearance of false sutures.

DEVELOPMENT OF PHYLLOPODS.—Claus, in the last Heft of the sixth volume of the Arbeiten zool. Inst., Wien, gives an account, illustrated with twelve plates, of the structure and development of the Phyllopod genera Branchipus and Artemia, which supplements his former paper published in Göttingen, 1873. He discusses the segmentation and development of the body during metamorphosis, the segmentation of the mesoderm and the differentiation of the ectodermal and mesodermal organs, the formation of regions and the number of segments, integument, connective tissue and fat bodies, muscles, nervous system and sense organs (including the median and lateral eyes), the alimentary and excretory organs, heart, circulation and respiration, and the sexual organs, thus giving a monographic treatment of the development of the group.

THE RIBS OF SPHENODON (HATTERIA).—Cope[1] has shown that in some of the Pelycosauria the capitulum of the two-headed ribs is attached to the intercentrum.

The question arose immediately: Is it not probable that the living Sphenodon with so many characters common to the Permian Pelycosauria shows the same condition?

The ribs of Sphenodon are described by Owen, Günther and Albrecht. None of these authors speak about ribs connected with the intercentrum (hypapophysis), but they have observed two-headed ribs in the cervicals.

Owen[2] says: "The fourth vertebra has a short pleurapophysis on each side with a bifurcate proximal end articulated by a broad tubercle to the diapophysis and by a slender neck and head to a

[1] Cope, E. D. Description of Extinct Batrachia and Reptilia from the Permian formations of Texas. Palæontol. Bull. No. 29, p. 518. Amer. Philos. Soc., April 5, 1878.

The Relations between the Theromorphous Reptiles and the Monotreme Mammalia. Proc. Amer. Assoc. Advanc., Sc., Vol. XXXIII, Philadelphia meeting, September, 1884.

[2] Descriptive Catalogue of the Osteological Series contained in the Museum of the Royal College of Surgeons of England. Vol. I. London, 1853, p. 142.

rudimental parapophysis, but this is very feebly marked off from the diapophysis. In the fifth vertebra the parapophysis and diapophysis form together an oblique ridge, chiefly extended vertically, and to which the expanded head of the pleurapophysis articulates by a single surface."

Günther[1] says: "In one example the pleurapophysis of the fourth vertebra is not bifurcate, the lower branch being replaced by a ligament, and no trace of a parapophysis can be distinguished."

Albrecht[2] says: "Quatrième vertèbre cervicale.—Diapophyses bien développées et séparées par une échancrure d'un rudiment de parapophyse. Tubérosité de la côte également bien développée et séparée aussi par une échancrure du col de la 4^{e} côte cervicale. La diapophyse articule avec la tubérosité de la dite côte, tandis que le rudiment de parapophyse est réuni par un ligament au col. Nous avons donc ici une combinaison des cas de Owen et de Günther."

According to all these authors the first rib appears on the fourth vertebra.

My own examinations made on two alcoholic specimens of Sphenodon, show the following:

First vertebra (atlas). — Single headed *ligamentous* ribs connected with the distal part of first intercentrum (between occipital condyle and atlas).

Second vertebra (axis). — Two-headed *ligamentous* ribs. Capitulum connected with distal part of second intercentrum (between atlas and axis); tuberculum connected with a small diapophysis of the vertebra.

Third vertebra.—First specimen, two-headed *ligamentous* ribs; second specimen, two-headed osseous ribs. Capitulum ligamentous connected with small process (parapophysis) on the posterior lateral part of third intercentrum, tuberculum connected with diapophysis.

Fourth vertebra.—Two-headed osseous ribs. Capitulum well developed but not entirely ossified, the proximal *ligamentous* part connected with the process (parapophysis) of fourth intercentrum, tuberculum attached to the well-developed diapophysis.

Fifth vertebra.—One-headed osseous ribs. Capitular part *rudimentary* and *ligamentous*, connected with fifth intercentrum, tuberculum well developed, attached to a short but broad diapophysis.

All the other cervical and dorsal vertebræ show the same condition as the fifth cervical.

Albrecht[3] believes that the diapophysis of the fifth and the

[1] Günther, A. Contribution to the Anatomy of Hatteria (Rhynchocephalus Owen). Philos. Trans., Part I, for 1867, p. 11.

[2] Albrecht, P. Note sur la prèsence d'un rudiment de Proatlas sur un exemplaire de *Hatteria punctata* Gray. Bull. Mus. Roy. d'Hist. Nat. Belg., Tome I, 1883, pp. 190–191.

[3] Albrecht, loc. cit., p. 190.

following vertebræ represents a *paradiapophysis* and the head of the rib a *capitulo-tuberculum.* I believe that the diapophysis consists of *diapophysis* only, and that the head of the rib represents only the tuberculum,[1] the capitulum being distinct but ligamentous.

The living Sphenodon shows therefore in principle the same condition of the rib-articulation as the Permian Pelycosauria. But there are still other Sauropsida which have some of the ribs connected with the *intercentrum.* In all Crocodilia and Dinosauria the first rib of the atlas is attached to the *intercentrum* between the occipital condyle and the atlas. The same condition can be found in birds, where this first rib has become ligamentous, and probably in all Sauropsida with ribs connected with the Atlas.

I do not doubt that the Ornithosauria show the same condition, since L. v. Ammon[2] has shown that the cervical ribs of Rhamphorhynchus are like those of the crocodile.—*Dr. G. Baur, Yale College Museum, New Haven, Ct., Sept. 19, 1886.*

Birds killed by electric light towers at Decatur, Ill.—I enclose a slip cut from the Decatur Republican of last evening; also a list of birds brought to me yesterday by boys from different parts of the city, as determined by Professor J. H. Coonradt of our High school. Some of them are seldom seen in this neighborhood, so far as my observation goes. Indeed, most of them are rarely noticed in the city this time of the year. I think none were found under the lamps this morning. From the numbers I saw and heard of yesterday I should think it probable that a thousand birds were killed around the electric light towers which light our town. I suppose this is not an unusual occurrence, but as the numbers were so great I thought possibly you would like to make a note of it.

Following is the list of the birds killed by the electric light towers: Redstart (*Setophaga ruticilla*), red-breasted grosbeak (*Goniaphea ludoviciana*), indigo bird (*Cyanospiza cyanea*), black and yellow warbler (*Dendræca maculosa*), house-wren (*Troglodytes ædon*), Maryland yellow-throat (*Geothlypis trichas*), Acadian flycatcher (*Empidonax acadicus*), scarlet tanager (*Pyranga rubra*) cat-bird (*Galeoscoptes carolinensis*). olive-backed thrush (*Turdus swainsoni*).—*E. A. Gastman, Decatur, Ill., Sept. 29, 1886.*

Zoological News.—*General.*—M. Zarondnoi (Bull. Mosc. Soc. Nat.) enumerates 184 species of birds in the Trans-Caspian fauna. He divides the district into three sub-regions, (1) the Kara-Kum desert, (2) the Akhal-Tekke oasis, (3) the mountains. The first district has a pretty well furnished flora, spite of its immense

[1] The same condition exists in the Lacertilia, Pythonomorpha, and Ophidia.

[2] Ammon L. v. Ueber das in der Sammlung des Regensburger naturwissenschaftlichen Vereins auf bewahrte Skelett einer langschwaenzigen Flugeidechse Rhamphorhynchus longicaudatus, Correspondenzblatt des naturwissenschaftlich. Vereins in Regensburg, 38 Jahrgang, 1884, p. 155.

sandy plain and salt clays. The reptiles of this sub-region, which extends into the Akhal-Tekke oasis, are, of lizards, two species of Phrynocephalus, *Agama sanguinolenta* and *Varanus scincus;* a Testudo, and the snake *Naja oxiana.* This oasis has a most monotonous landscape, but is pretty well furnished with insects, among them Julodis (3 sp.) several kinds of Ateuchus and Copris, and numerous Melanosomata. Jackals, and on the banks of the few rivers the wild cat and the Lagomys occur. The summer in this oasis is very hot; 40 Celsius in the shade is not uncommon. The summer molting of the birds is by our author attributed to this great heat. The lark has parts of its body quite bare at that season. The bulk of the birds of the oasis during the summer belong to the Aral-Caspian fauna, but others come from the mountains, following the rivers. Griffons, ravens, swifts and swallows live in the mountains, but descend to the plain to hunt. In the valleys of the mountains the leopard and the cheetah are rare, *Hyæna striata* is occasional, and *Ellobius talpinus,* several species of Erinaceus and Platycercomys and *Hystrix hirsutirostris* are common. The dreadful *Vipera eufratica* is a source of continual danger during the grape harvest of the forested upper valleys.

Protozoa.—Gruber has been studying the phenomena of conjugation as presented by Paramecium, and states that not only is there a union of the nuclei, but that the nucleoli "come into intimate contact, copulate with each other." He claims that the act has not only a sexual function but it plays a part in rejuvenescence, and that there is an exchange of protoplasm between the nucleoli.

Rhizopoda.—Mr. Whitelegge enumerates twenty-four species of Rhizopoda in New South Wales, mostly identical with those found in Europe, America and India. The list includes *Pelomyxa palustris, Rhaphidiophrys elegans, Clathrulina elegans,* and *Biomyxa vagans.*

Cœlenterates.—Mr. G. H. Fowler (Quart. Jour. Mic. Soc.) describes the anatomy of two species of madrepores. *M. durvillei,* has four features in common with the Alcyonaria: (1) a tendency to absence of polyps on the ventral side of the branches; (2) the very definite orientation of the polyps; (3) the differentiation of the mesenteries; (4) the distinct dimorphism.——Nothing has hitherto been known of the development of the Cubomedusæ. Haacke publishes in the Zool. Anzeiger (IX, p. 554) some notes on the development of an Australian Charybdea in which he shows that Haeckel was probably correct in his supposition that there was an alternation of generations in these forms. He also gives notes upon the development of the sense organs and phacellæ and states that the velar canals are at first unbranched. The umbrella at first is pyramidal, much like that of the Scyphostoma forms, and only later does it attain the cubical form characteristic of the

adult.——W. L. Sclater describes (Proc. Zool. Soc., 1886) a fifth species of deep-sea coral of the genus Stephanotrochus. It comes from the British seas and was dredged at a depth of 570 fathoms. Some notes are given of its anatomy.

Vermes.—Mr. W. B. Benham (Quart. Jour. Mic. Soc.) first gives a condensed historical review of the various works on earthworms, and a chronological record of the discovery of new facts; then briefly enumerates and describes all known earthworms; then takes the various organs in order, and points out their variations, and lastly describes some new species. Among these is *Microchæta rappi* from South Africa, a worm three feet six inches long, and therefore comparable with Antæus and Titanus from South America. Another species of Microchæta from Natal follows, and is succeeded by Urobenus (1 sp.), Diachæta (1 sp.), and Trigaster (1 sp.) all new genera.——Mr. Weldon contributes to the same journal an account of *Dinophilus gigas*, found at Penzance, England. Three species of the genus were previously known. Dinophilus is stated on the one hand to be related to the Archannelids, while on the other it retains many features characteristic of the common ancestor of these groups, in which Mr. Weldon includes Crustacea, Mollusca and Rotifera, as well as Chætopoda and Gephyrea. The relations of the body cavity, excretory system and pharynx point to a Turbellarian origin.——The tapeworm, *Tænia filicollis*, has been known as a parasite of the sticklebacks (Gasterosteus). Dr. Leidy now reports it from specimens of Amia from North Carolina, though there is some doubt as to whether it was really parasitic in these fishes.——E. A. Rau reports four cases of trichinosis at Bethlehem, Pa., in the early part of the present year, two of which resulted fatally. All were caused by eating from the same infected pork.——Kennel, in the last "Heft" of "Semper's Arbeiten," completes his account of the development of Peripatus. He differs greatly on many points from Sedgwick's account of the embryology of the species of the same genus from the Cape of Good Hope.

Arthropoda.—J. J. Quelch has announced (Nature, July 29, 1886) that a Peripatus, apparently *P. edwardsii*, is found in the Demerara division of British Guiana. An example which, when not elongated, is about three and a half inches long, has thirty-one pairs of feet, the last three of which it rarely puts to the ground except when it goes backward. It frequently discharges a viscid secretion when handled. Mr. Im Thurm previously found small specimens in Essequibo.——According to observations made by M. G. St. Remy upon the brains of *Scolopendra morsitans* and some other myriapods, the Myriapod brain is simple and approaches that of Crustacea.——M. Trouessart (Comptes Rendus, July, 1866) notes the presence, within the upper part of the shaft of the feathers of a curlew shot in the winter, of several Mallophaga of the genus Colpocephalum. The hole by which these insects

entered was placed upon the lower side of the feather, in the furrow, about two centimeters from the upper umbilicus. The insects were dead, and were accompanied by the empty shells of the eggs they had laid, with a few ova which still contained embryos. A hole about five millimeters from the lower umbilicus was apparently the outlet of the larvæ. The interior of the soft portion of the feather had been devoured. It is not yet ascertained what conditions determine these devourers of feathers to seek refuge within the quill. Acaridæ, Syringophilus and other genera have before been found within the shaft, but these seem to enter by the upper umbilicus.——Houssay has been studying the arterial system of the scorpion (Comptes Rendus, Aug. 2, 1886, p. 354). The greatest interest centers in his description of the sternal artery which ensheathes the nervous cord almost exactly as it does in Limulus, thus affording additional evidence in favor of the view held by Van Beneden, Lankester and Kingsley, that the king crab is closely related to the spiders.——Winckler having recently announced that he had found a heart in the Gamasid mites, and that it could be studied through the transparent integument of the living animal; Kramer calls attention to the fact that he announced the same in the Archiv. für Naturgeschichte for 1876.——Brady gives a list (Proc. Zool. Soc., 1886) of all the known Entomostraca of South Australia, and adds several new species to the number.——Beddard, in the same journal, completes his preliminary account of the *Challenger* Isopoda.——Frenzel thinks the "Mitteldarmdruse" (the so-called liver) of the Crustacea has the function of a digestive gland which shows in its physiological action, great similarity to the pancreas of the Vertebrata.——Another "fossil myriapod" must go, it having been discovered that "Trichiulus" was based upon a fern.

Mollusca.—M. Th. Barrois gives in his thesis before the Faculty of Sciences of Paris an account of the foot-glands and aquiferous pores of the lamellibranchs. There is great variety in the byssus-forming apparatus, but *Cardium edule* furnishes a good typical example. The byssus is a glandular product, and does not consist of dried or chitinized muscular fibers. *C. edule* has a simple byssus of one filament, while Lima, Pinna, and Avicula have many. In Arca the filaments are united into a mass, and Anomia has a similar mass which is encrusted with calcareous salts, so as to appear as an ossicle. M. Barrois describes the muscles of the byssus; the cavity of the byssus, which receives the secretion; the glands of the cavity; the byssal canal; the groove, and the glands of the groove. In some species every vestige of the byssal pparatus has disappeared (*Solen ensis*, etc.), while other forms show a partial disappearance. The mucous glands are sometimes scattered over the foot, but more often they are localized in the free anterior extremity; while in Lima, Pecten, and Anomia they discharge into a furrow. It has often been argued that the rapid

increase and diminution of size observable in the foot must be caused by the presence of aquiferous pores which permit water to enter into the circulation, but M. Barrois has searched in vain for such pores.——M. Giard has discovered a new species of Entoniscus (*E. mœnadis*) upon a female *Carcinus mœnas* obtained at Wimereux. It was situated upon the left side of the animal, in the midst of the hepatic cæca.——The question why the scallop, Pecten, is so abundantly supplied with eyes has often been asked and has never received a satisfactory answer. Dr. Benjamin Sharp now states that these organs are really phosphorescent and that as the production of light would be of advantage to the animal this may possibly explain their abundance.——W. D. Hartman adds new difficulties for the students of conchology by describing several more "species" of the much-abused genus Partula of the South Seas. There is now not much choice between Partula or Achatina and our own Unio.——Heilprin reports a remarkable instance of vitality in a marine mollusk. Specimens of *Ilyanassa obsoleta* lived for a year removed from salt-water, and for several months of this time they were placed in close proximity to a heated wall where certainly the conditions were not favorable for them.

Fishes.—Dr. Paul Albrecht, formerly of Brussels but now of Hamburg, notes the occurrence, in an example of *Protopterus annectens* in the Konigsberg Museum, of a pectoral member (the right), which is forked at the distal extremity. Above this divided fin are two small outer gills, while there is but one above the left pectoral. Dr. Albrecht considers the dorsal division as the ulna, the ventral as the radius.——H. H. Giglioli sends to Nature an account of the capture of a specimen of *Mullus barbatus* which by some means had become tightly encased in a large colony of *Pyrosoma atlanticum*. The head of the fish had reached the bottom of the social cylinder, and only about a fourth of its length projected posteriorly. It was taken alive.

Reptiles.—Messrs. Mitsukuri and Ishikawa (Quart. Jour. Mic. Soc.) report as a general result of their studies of the formation of the germinal layers in the Chelonia, that the development of the Reptilia harmonizes completely with that of Batrachia.

Birds.—Some remarkable birds of paradise have been recently described by Dr. Finsch and Dr. Meyer (Zeitsch. Ges. Orn. II, pp. 369–391). Among them is *Paradisornus rudolphi* with blue wings and blue flank-plumes. These novelties were discovered by Mr. Hunstein in the Astrolabe range of New Zealand. Mr. Forbes has since collected most of Mr. Hunstein's species, and also a Melithreptes and a Pseudogerygone which seem to be new. Mr. Forbes' birds of paradise, gathered in the rainy season, show the molts and changes of plumage of these birds.——M. M. Charbonnel-Salle and Phisalix have studied the so-called "milk"

with which pigeons feed their young and find that it is not a glandular secretion (as is the material with which the Callocalia constructs its edible nests), but is a formation of modified epithelial cells. This material is produced in the œsophagus of both the male and the female parents until about the twentieth day after the eggs have hatched.

EMBRYOLOGY.[1]

WHY DO CERTAIN FISH OVA FLOAT?—In a recent paper, by a Mr. Prince (Ann. and Mag. Nat. History, 1886), his readers are informed that the buoyancy of certain fish ova is not due to the presence of drops of oil in the yolk as supposed by Ryder, or words to that effect. Had my conclusions not been so summarily disposed of by one whose information is clearly not very accurate or extensive, the writer would not trouble himself to reconsider the subject of the buoyancy of fish ova. In my Embryography of Osseous Fishes (p. 118), I have stated that "the buoyancy of the cod's egg is undoubtedly due to the diminished specific gravity of the protoplasmic matter of the vitellus, and not to the presence of any oils. In this respect it represents an unique type of the buoyant ovum." This statement, published in 1884, but written in 1882, is essentially the same as that of Mr. Prince, published in 1886. Comment is unnecessary.

There are several types of buoyant ova. These are: (1) Those in which the specific gravity of the yolk is diminished, as in the egg of the cod; (2) those in which large oil-drops in an eccentric position aid in causing the eggs to float; (3) those in which a very large oil-drop caused the ovum to float even in fresh water.

These three categories are also, in all probability, connected by intermediate kinds; that is, amongst forms of the second series there are some which are buoyant in water with as low a specific gravity as 1.014, while others are not buoyant in water of less specific gravity than 1.025, while those in which the proportion of oil to plasma is very great, or about as 1 to 7, are buoyant in water with a specific gravity of very nearly 1.000, or in that which is fresh.

As a rule, the buoyant ovum has the oil gathered into a single drop embedded in the vitellus nearly opposite the germinal disk; there seem to be few exceptions to this rule. There are also but very few species known which have buoyant ova without an oil drop, and these are buoyant only in water of rather high specific gravity. Furthermore, as a rule, fish ova which are buoyant are not adhesive, but float about near the surface singly; the most noteworthy exception to this rule is presented by the great pelagic egg-ribbons of Lophius.

[1] Edited by JOHN A. RYDER, Biological Department, Univ. of Penna., Philadelphia, Pa.